Infinova®

FIBER OPTIC TRANSMISSION SYSTEM

N3731 & N3531 SERIES

Digital One Video with 2-ch Data Combination

User Manual

Infinova

Contents

SERVICE NOTICE 1
PRODUCT DESCRIPTION 2
ORDERING INFORMATION 3
INSTALLATION 3
POWER SUPPLY 5
TRANSMITTER PANEL 6
- N3531T-1D1B & N3731T-1D1B 6
- N3531T-2D & N3731T-2D 7
- N3531T-1D1E & N3731T-1D1E 8
- N3531T-1D2C & N3731T-1D2C 9

RECEIVER PANEL 10
- N3531R-1D1B & N3731R-1D1B 10
- N3531R-2D & N3731R-2D 11
- N3531R-1D1E & N3731R-1D1E 12
- N3531R-1D2C & N3731-R1D2C 13

2F TRANSCEIVER PANEL 14
- N3531TA/RA2F-1D1B & N3731TA/RA2F-1D1B 14

DIP SWITCH SETTINGS 15
TYPICAL SYSTEM CONNECTION 17
- One Video with One RS232 and One DIP Selectable Data 17
- One Video with One DIP Selectable Data and One Factory Selectable Data 18
- One Video with One DIP Selectable Data and One C.C 19
- One Video with One DIP Selectable Data and Two One-way C.C 20
- One Video with One RS232 and One DIP Selectable Data, 2F 21

NETWORK MANAGEMENT 22
DAISY CHAIN 23
TRANSMISSION REPEATER 24
CONTACT CLOSURE SIGNAL 25
CODE DISTRIBUTOR 26
CABLE DIAMETER CALCULATION AND LIGHTNING & SURGE PROTECTION 27

SERVICE NOTICE

The installation of this product should be conducted by qualified personnel. Do not attempt to service this product yourself. Refer all servicing to qualified personnel.

If you require information during installation of this product or if service seems necessary, contact the local suppliers or Infinova at 1-732-355-9100 in 51 Stouts Lane, Monmouth Junction, NJ 08852 U.S.A. You must obtain a Return Authorization Number and shipping instructions before returning any product for service.

Our obligation under this warranty is limited only to the repair or replacement of any of our products, provided that products are used within the specified ratings and applications, and that products are applied in accordance with good engineering practices, and that products are proved by our examination to be defective.

This warranty does not extend to any Infinova products which have been subject to acts of accident, misuse, abuse, neglect, improper application or installation, improper operation or maintenance, connection to an improper voltage supply or to materials which have been altered or repaired outside an authorized Infinova factory repair center.

Information provided by Infinova is accurate and reliable. However, no responsibility is assumed by Infinova for its use; nor for any infringements of other rights of third parties which may result from its use. No license is granted by implications or otherwise under any patent or patent rights of Infinova.

WARNING

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

DO NOT LOOK INTO OPTICAL PORTS WITH POWER ON.

Description

The N3731 and N3531 series provide high quality reliable transmission of one digitally encoded composite video with one RS232 and one DIP selectable data (1D1B), one DIP selectable data and one factory selectable data (2D), one DIP selectable data and one contact closure (1D1E), one DIP selectable data and two one-way contact closure (1D2C) over one or two optical fibers. The modules are compatible with PAL, SECAM, and NTSC video signal. Data interface supports RS232, RS422, Manchester/Biphase and 2-wire-or-4-wire RS485. Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments. Each transmitter or receiver incorporates status indicators for monitoring of proper system operation. The modules are available in either stand-alone, card unit or plug-in integration transmitter versions.

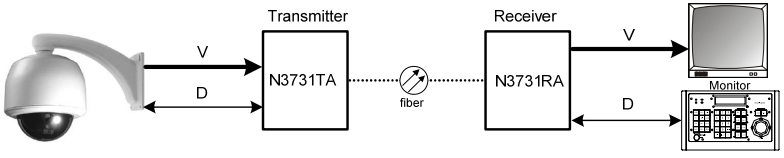
Stand-alone module	Card unit

The N3731 series are compatible with 9/125micron single-mode fibers; the N3531 series are compatible with 50/125 or 62.5/125micron multimode fibers.
Camera end transmitter N3731TA is compatible with monitor end receiver N3731RA; camera end transmitter N3531TA is compatible with monitor end receiver N3531RA.

Accessories (optional)

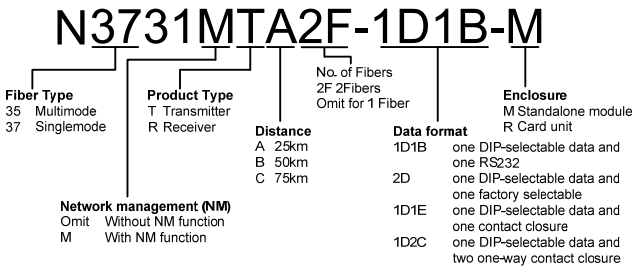
N3910-000X	19" 1U fan assembly
N3951	Fiber optical transmission repeater
N3952	8-ch contact closure signals collector
N3954	Control code distributor

System Diagram



ORDERING INFORMATION

Use the Configuration chart below to select the options available for this product.



Note:

1. The transmission distance category is only valid for single-mode product.
2. There are only TA and RA for multimode product, and can transmit 4km.

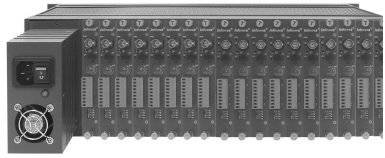
INSTALLATION

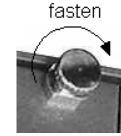
Installation of video and data interface

To install the apparatus, it is necessary to allow enough space to accommodate the bend radius of the optical cable connected to it. The transceiver requires as short as practical one BNC terminated coaxial cable to input/output the video signal. Data interface uses a 9-position terminal block connector.

Installation of card unit

To install in the chassis, orient the card with the Infinova logo at the top of the module and slide onto the top and bottom card guides in the chassis. Press securely on the top and bottom of the module to ensure that it is fully seated in the chassis so that the electrical connector mates with the chassis-mounted motherboard. Once installed, manually tighten the two thumbscrews located at the top and bottom of the card. Do not use tools to secure these and do not over tighten.





Full load of N3910-18S

There are 18 slots on N3910-18S. So it can mount 18 pieces of N3731 or N3531 card unit. Besides N3910-18S, there are N3910-1S, N3910-2S, N3910-3S, N3910-4S and N3910-15R optional. There are 1 slot on N3910-1S, 2 slots on N3910-2S, 3 slots on N3910-3S, 4 slots on N3910-4S and 15 slots on N3910-15R respectively.

WARNING:

A FULL LOAD OF N3910-15R AND N3910-18S SUBRACK REQUIRES FORCED AIR COOLING IN THE RACK. TO AVOID OVER HEATING OF CARD UNITS, WHENEVER POSSIBLE, INSTALL IN EVERY OTHER SUBRACK.

Forced air cooling with N3910-000X

Power supply for card unit

The N3731 and N3531 card unit is powered by a plug-in power supply that is provided with the appropriate desk chassis or EIA 19" subrack.

Power supply for stand-alone module

The N3731 and N3531 card unit can be converted into a stand-alone module when installing into a 1-slot chassis N3910-1S that is powered by a plug-in 24VAC @ 830mA (N3921-24A-1 for 110V; N3921-24A-2 for 230V) or 12VDC @ 1A (N3921-12D-1 for 110V; N3921-12D-2 for 230V) power supply. Plug the wires into the connectors, fasten the screws to make a firm connection, see figure below.

N3921 power supply	Connection Diagram

Power supply for plug-in integration transmitter

Power to the plug-in integration transmitter is supplied from the dome.

Note:

When the series is powered together with other devices (cameras and etc.) by a single 24VAC power source, please make sure that the related device has a full-wave (bridge) rectifier circuit.

N3531T-1D1B & N3731T-1D1B

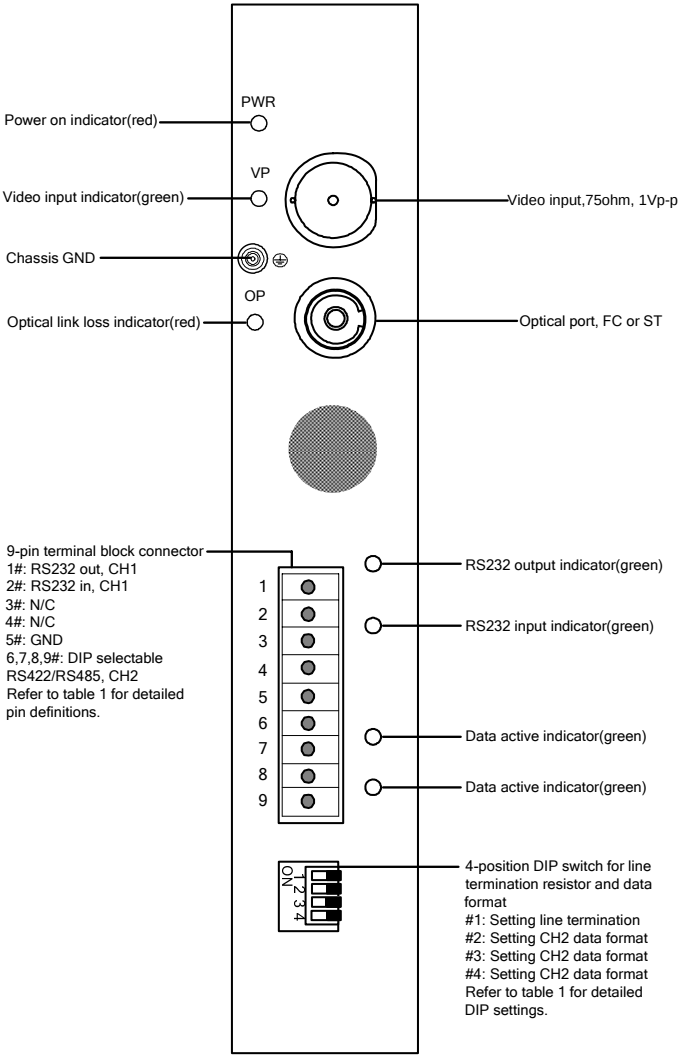


Figure 1

N3531T-2D & N3731T-2D

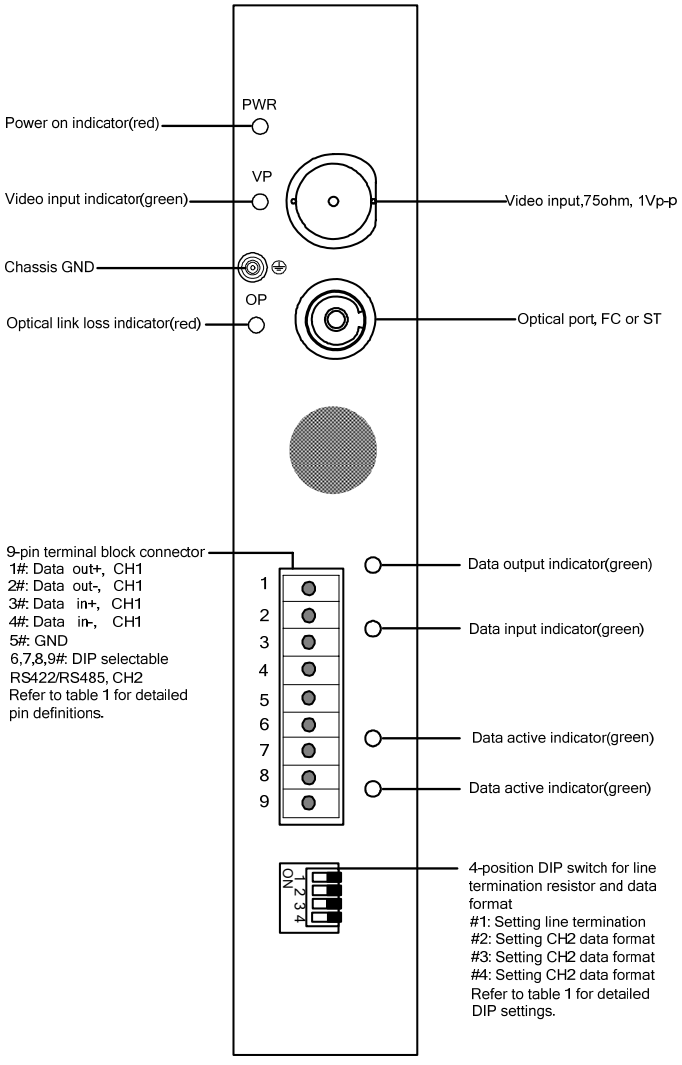


Figure 2

N3531T-1D1E & N3731T-1D1E

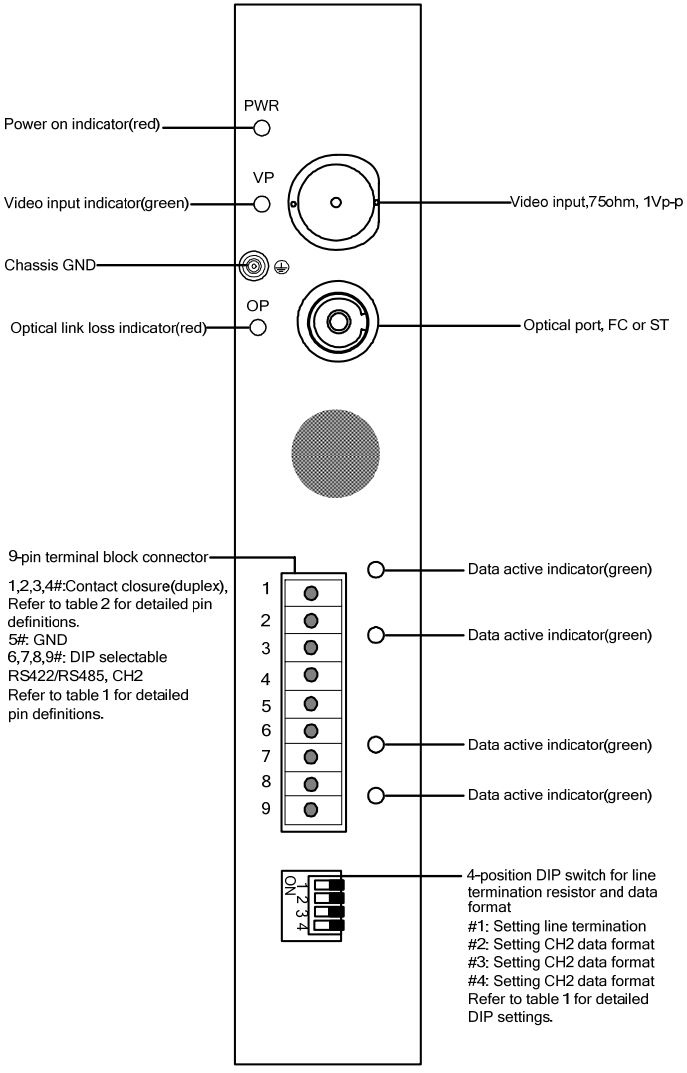


Figure 3

N3531T-1D2C & N3731T-1D2C

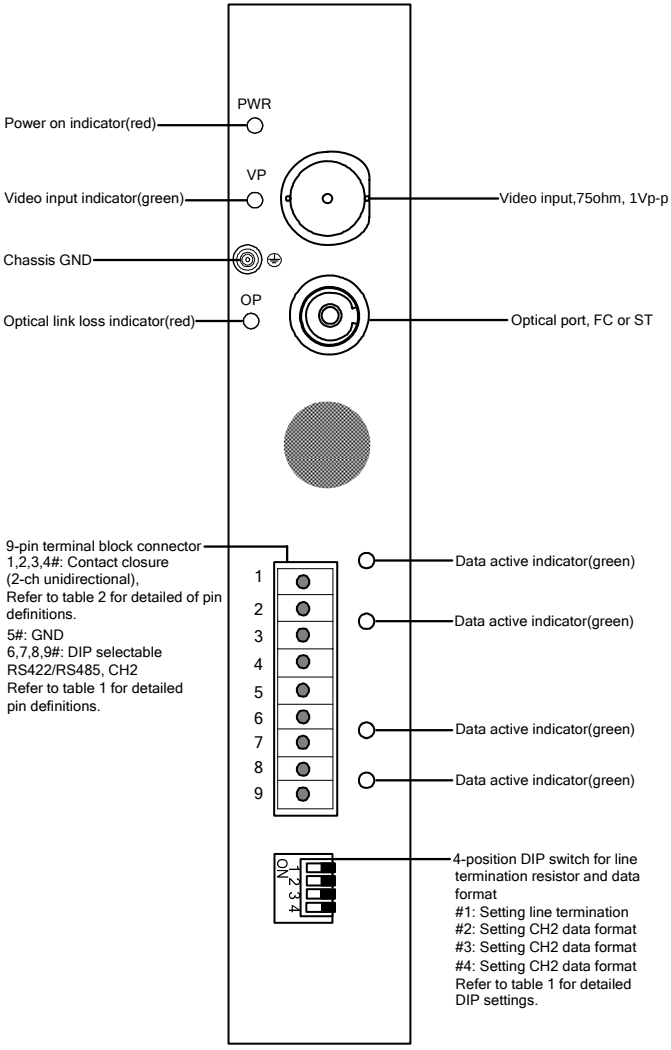


Figure 4

N3531R-1D1B & N3731R-1D1B

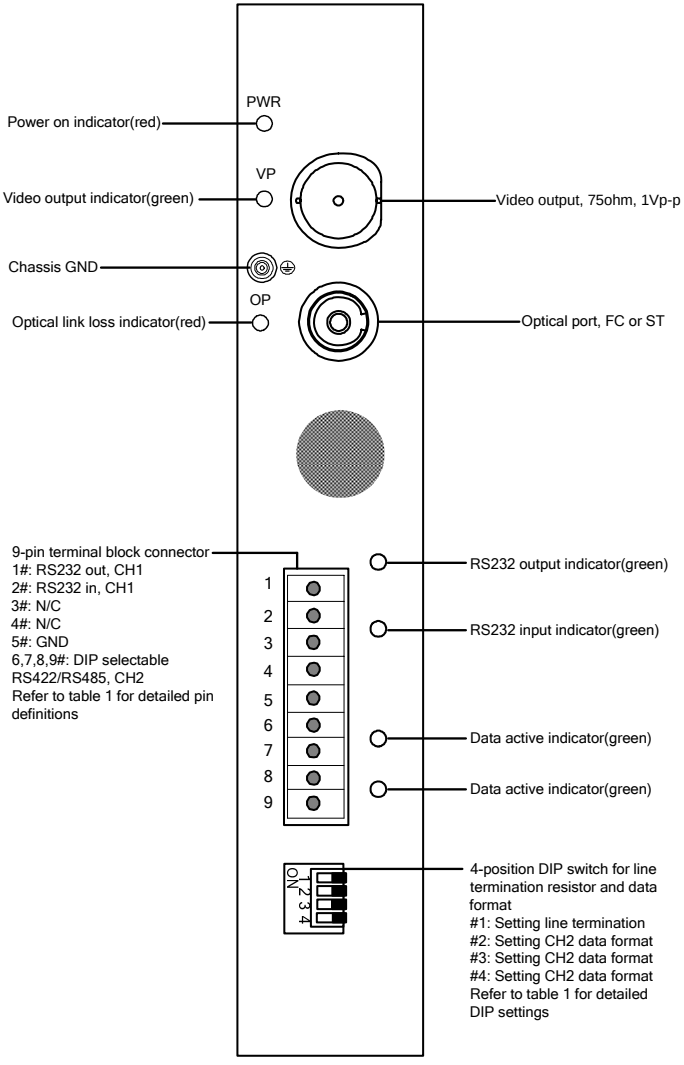


Figure 5

N3531R-2D & N3731R-2D

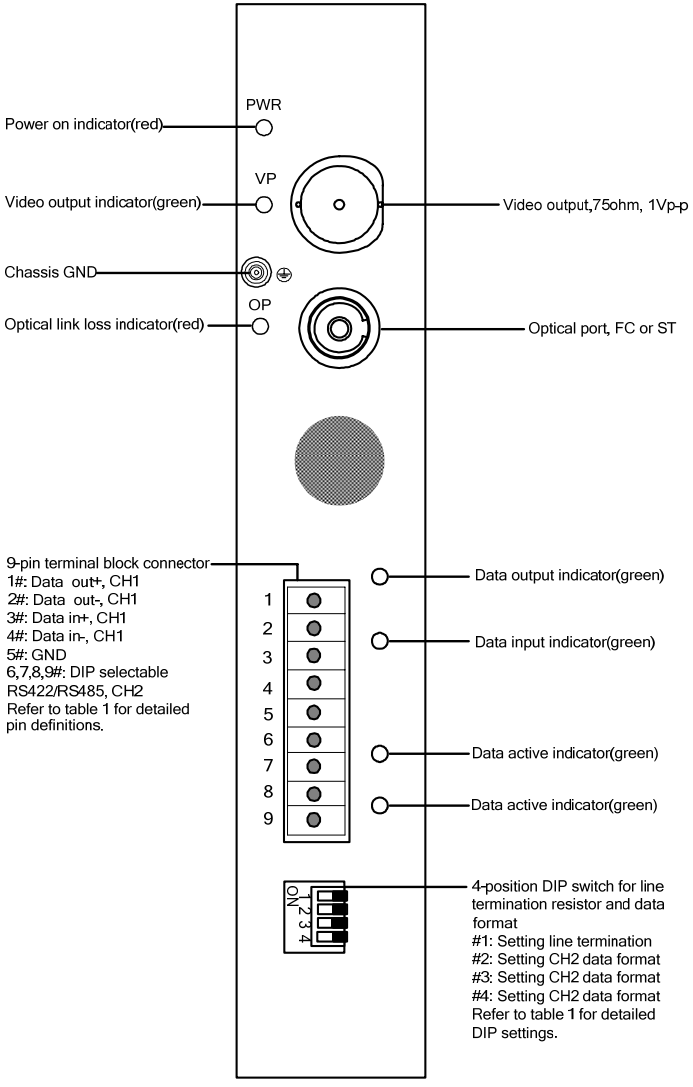


Figure 6

N3531R-1D1E & N3731R-1D1E

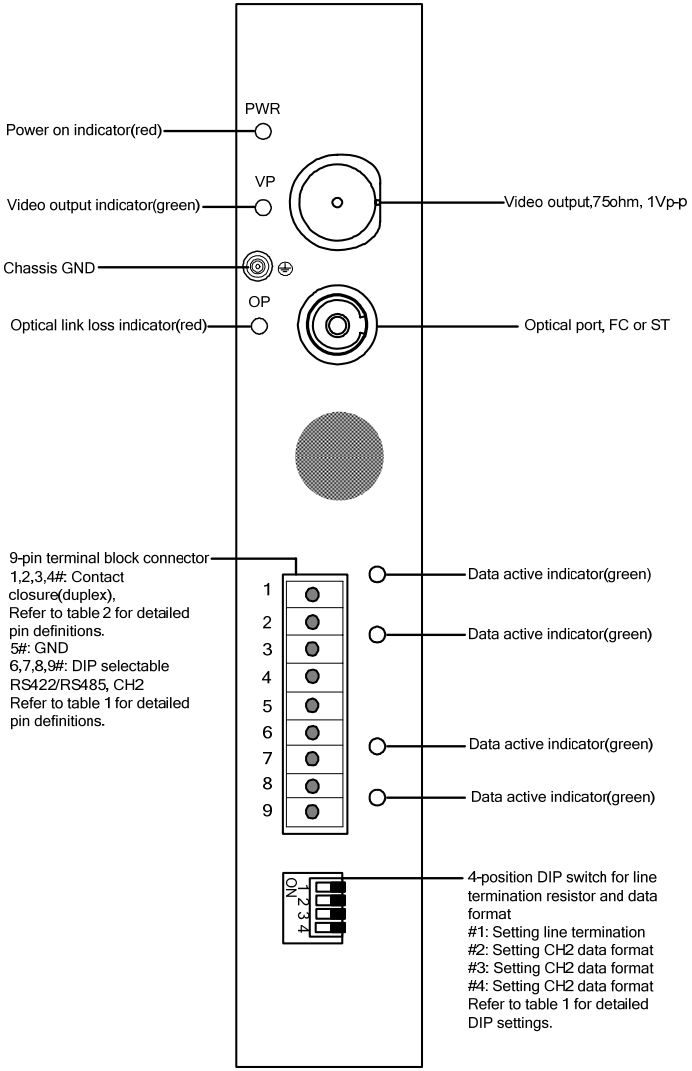


Figure 7

N3531R-1D2C & N3731-R1D2C

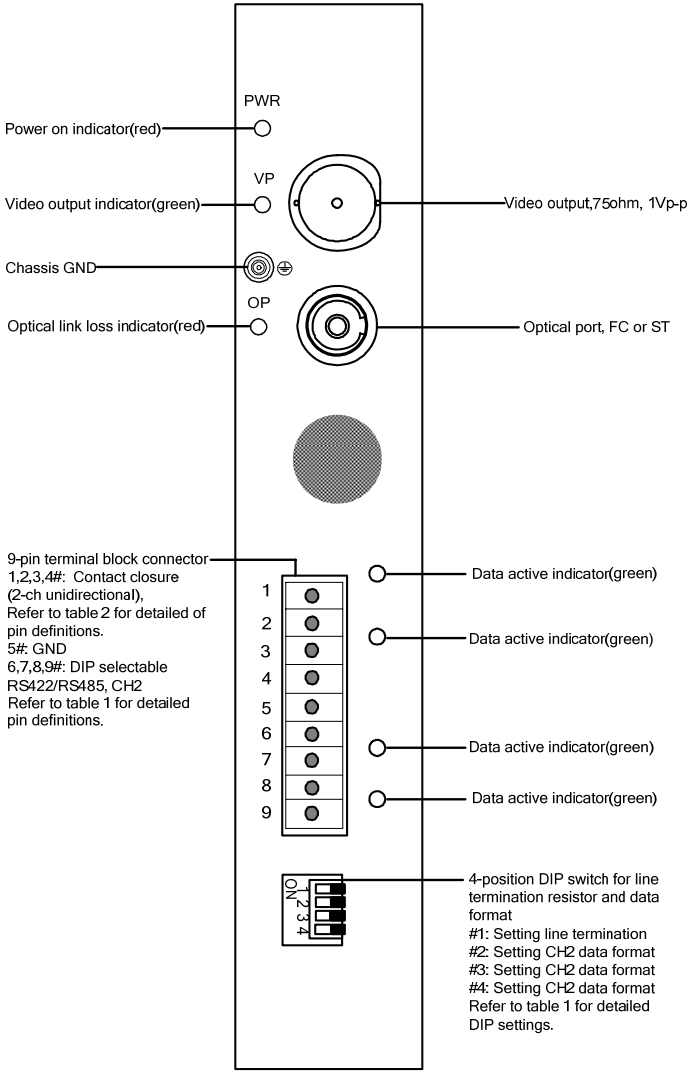


Figure 8

N3531TA/RA2F-1D1B & N3731TA/RA2F-1D1B

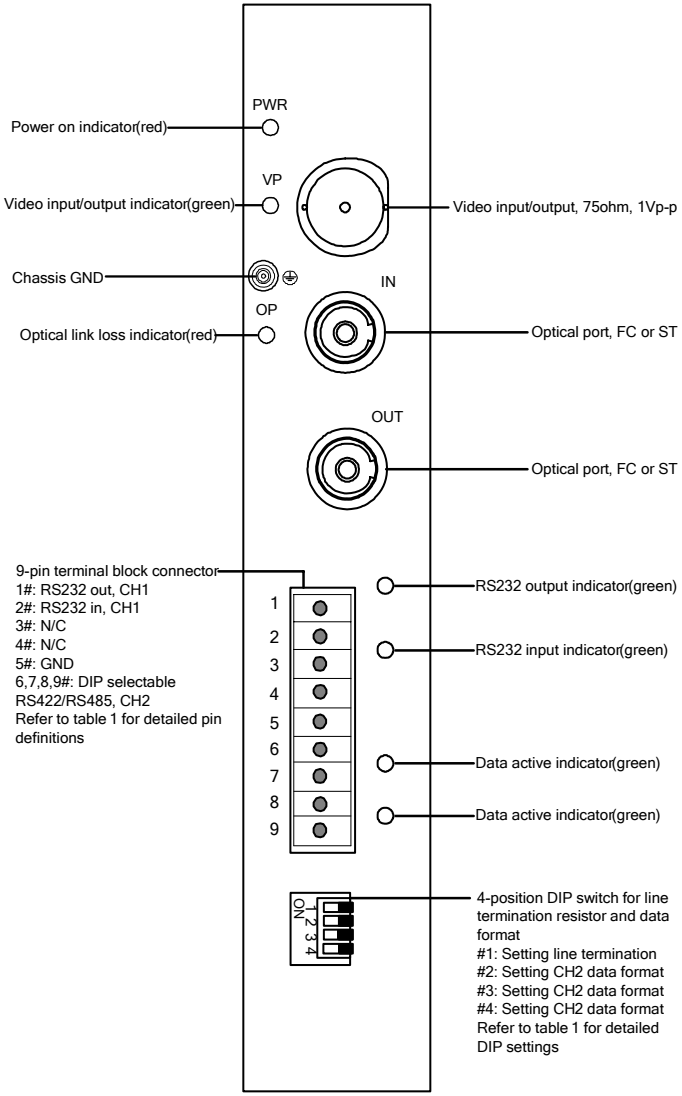


Figure 9

DIP SWITCH SETTINGS

DIP-2, DIP-3 and DIP-4 are to set CH2 data format. They should be identical on both transmitter and receiver for specific data format. Table 1 illustrates the detailed DIP settings and pin definitions for CH2 data channel. **Black indicates the DIP switch**.

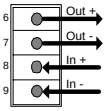
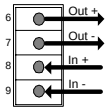
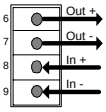
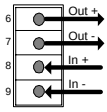
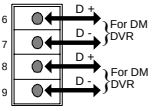
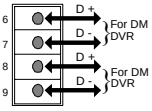
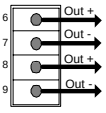
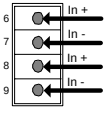
Data format	DIP	Transmitter	Receiver
Full duplex 4 - wire RS485 (off, off, off)			
RS422/Manchester/Biphase (off, off, on)			
Half duplex 2 - wire RS485 (off, on, off)			
Return RS422/Manchester/Biphase (off, on, on)			

Table 1. DIP switch setting reference

Contact Closure transmission

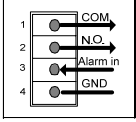
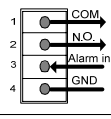
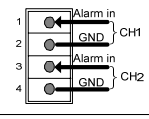
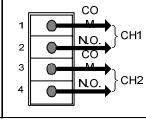
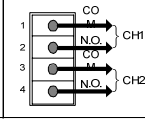
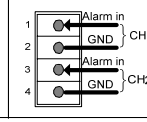
Duplex contact closure		2-ch forward contact closure		2-ch return contact closure	
Transmitter	Receiver	Transmitter	Receiver	Transmitter	Receiver
					

Table 2. Contact closure pin definitions

Termination resistor

A multipoint bus architecture requires termination at both ends of the bus line to restrain signal reflection. The termination resistors must be within 20 percent of the characteristic impedance of the cable and can vary from 90Ω to 120Ω.

DIP-1 is to enable/disable 120Ω termination resistor, set it ON/OFF to connect/disconnect 120Ω termination resistor between Pin8 and Pin9; set it ON/OFF to connect/disconnect 120Ω termination resistor between Pin3 and Pin4.

One Video with One RS232 and One DIP Selectable Data

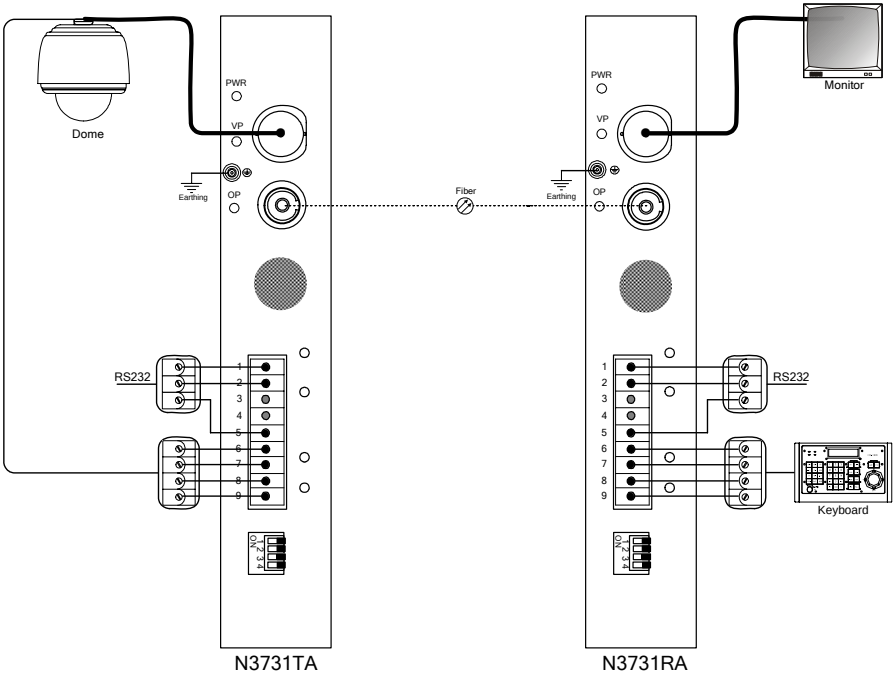


Figure 10

Note:

1. Please refer to table 1 for detailed DIP settings and pin definitions for specific data format.
2. Set DIP-1 ON to connect a 120Ω termination resistor between Pin 8 and Pin 9 whenever termination resistor is required.

One Video with One DIP selectable Data and One Factory Selectable Data

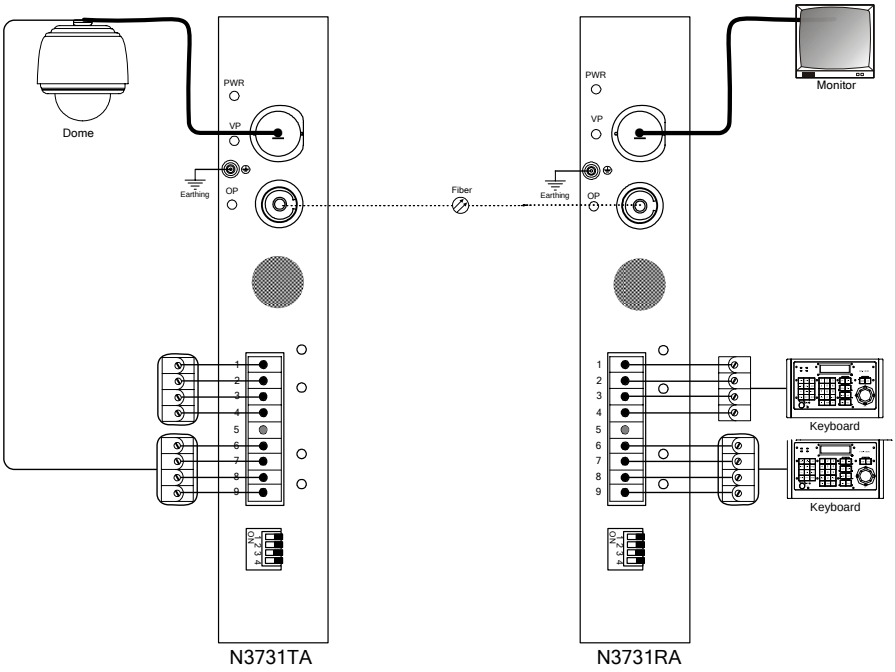


Figure 11

Note:

1. Please refer to table 1 for detailed DIP settings and pin definitions for specific data format.
2. Set DIP-1 ON to connect a 120Ω termination resistor between Pin 8 and Pin 9 whenever termination resistor is required.

One Video with One DIP Selectable Data and One C.C

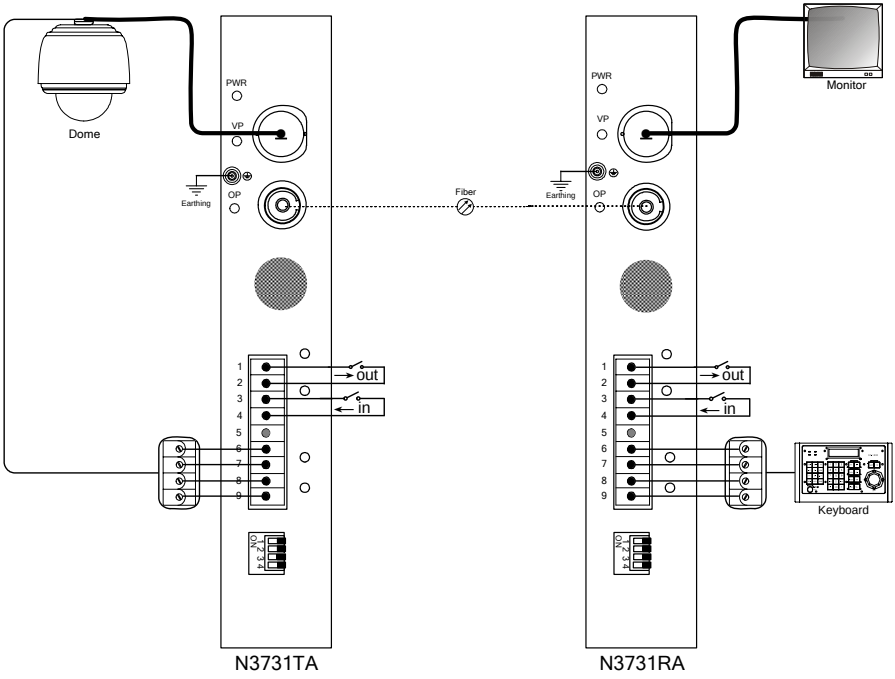


Figure 12

Note:

1. Please refer to table 1 for detailed DIP settings and pin definitions for specific data format.
2. Set DIP-1 ON to connect a 120Ω termination resistor between Pin 8 and Pin 9 whenever termination resistor is required.
3. Please refer to table 2 for detailed of contact closure.

One Video with One DIP Selectable Data and Two One-way C.C

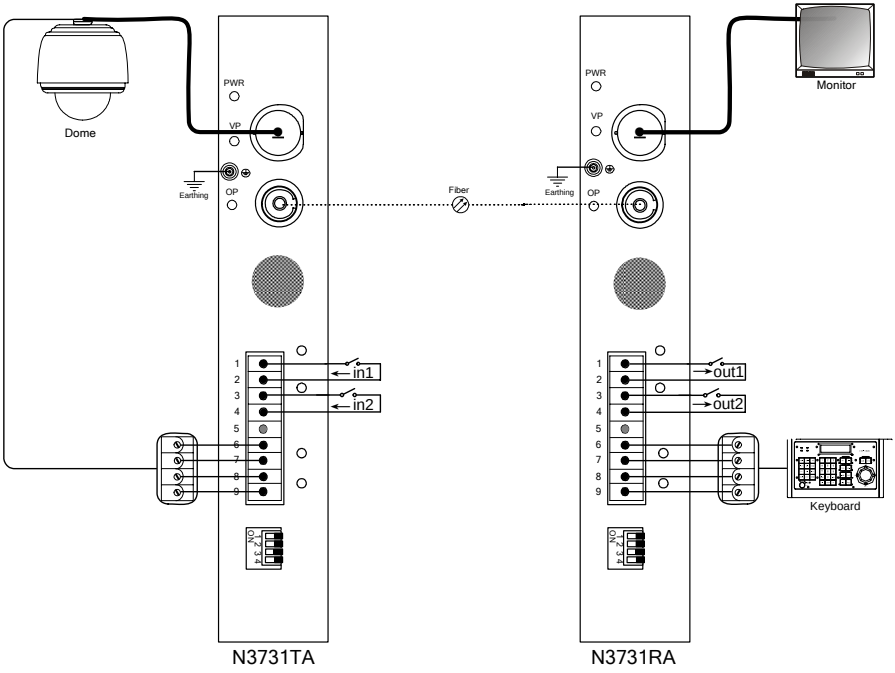


Figure 13

Note:

1. Please refer to table 1 for detailed DIP settings and pin definitions for specific data format.
2. Set DIP-1 ON to connect a 120Ω termination resistor between Pin 8 and Pin 9 whenever termination resistor is required.
3. Please refer to table 2 for detailed of contact closure.

One Video with One RS232 and One DIP Selectable Data, 2F

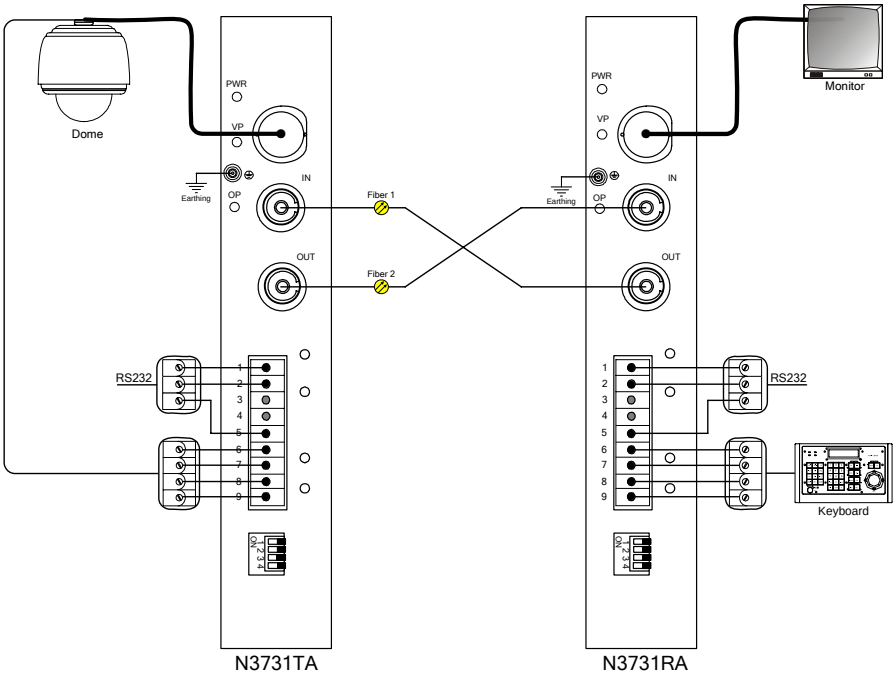


Figure 14

Note:

1. Please refer to table 1 for detailed DIP settings and pin definitions for specific data format.
2. Set DIP-1 ON to connect a 120Ω termination resistor between Pin 8 and Pin 9 whenever termination resistor is required.

The N3731 and N3531 series can add a network management system. After installing the NM system N3981, the remote transmitters send their running status to their respective receivers. The network management board collects and sends all the status information of the transmitters and the receivers to a host PC. With the network management software, users can survey the status of the remote transmitters and central receivers on the host PC conveniently, and can check all of the historical running status from the alarm log.

The list below shows all of the status which the Network Management system can monitor:

1. the power supply status of transmitter and receiver
2. the optical link status of transmitter and receiver
3. the video signal status of transmitter and receiver
4. the data status of transmitter and receiver
5. the operating temperature of transmitter and receiver

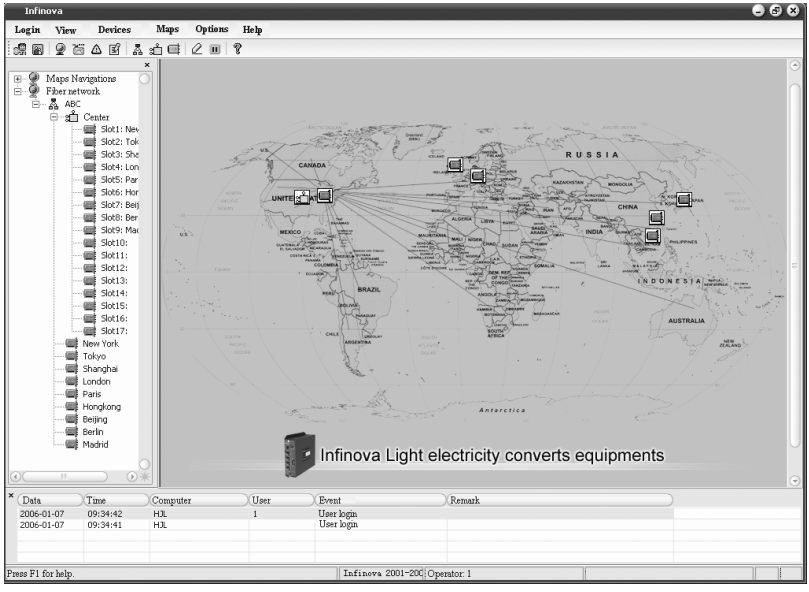


Figure 15. Network management software

We can use daisy chain connection to simplified the wiring and controlling of remote domes. The control signal is connected to all of the N3731RA or N3531RA, and transmitted to all of the N3731TA or N3531TA through fiber optic respectively. In the remote site, the specified dome will act as the control signal instructs. The number of video receiver daisy-chained depends on the driving capability of code source.

System Diagram

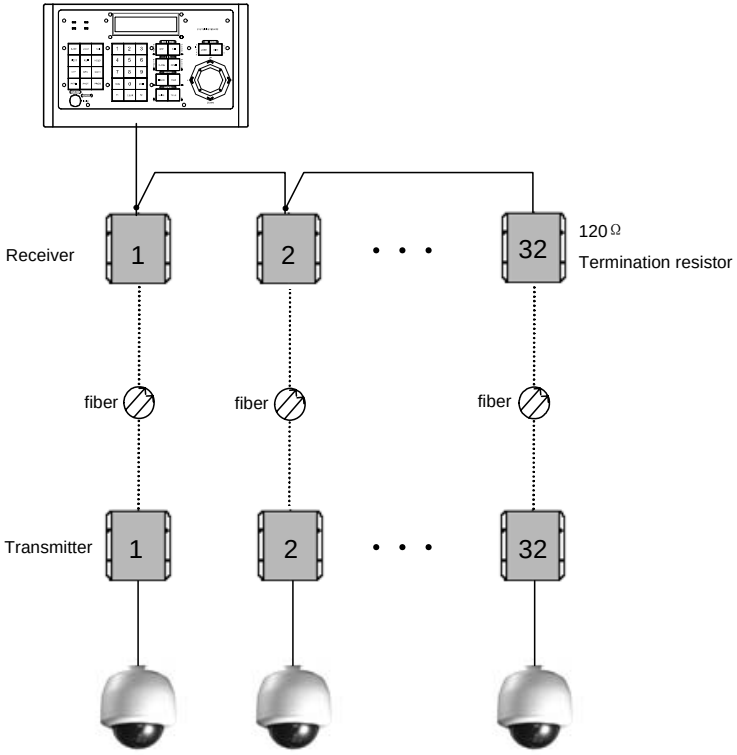


Figure 16. Daisy chain

Note:
There should be a 120Ω termination resistor on the final receiver for restrain signal reflection. Please pay attention to it.

The N3951 series is used between transmitter and receiver to extend the transmission distance of fiber optical system. It magnifies the optical signal received from transmitter, and sends it to receiver. By using a N3951, the transmission distance of the system is doubled.

Typical Application Connection

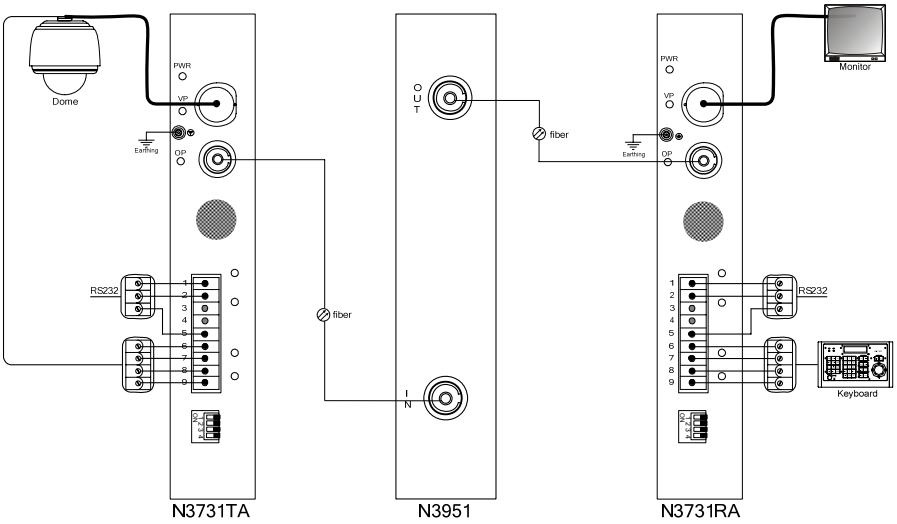


Figure 17. Transmission repeater

The N3952 series is a contact closure signals collector. N3952TA converts 8-ch contact closure signals to one RS232/RS422/RS485 data, and N3952RA converts RS232/RS422/RS485 data to 8-ch contact closure signals. The N3952 series can transmit the contact closure signals over a long distance when connecting with fiber optical transmission system. The number of contact closure channels is default setting, so are the data format.

Typical Application Connection

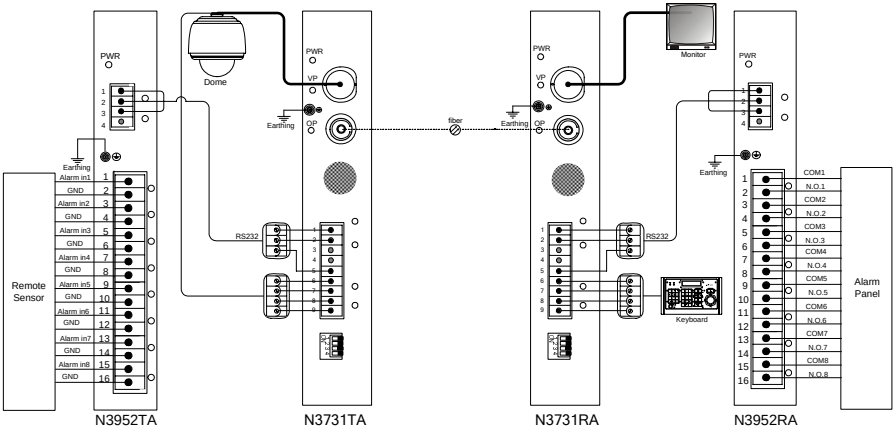


Figure 18. Contact closure signal

The N3954 is a code distributor designed for star connection where the code source is too far away from the video receiver and overload or reflection occurs.

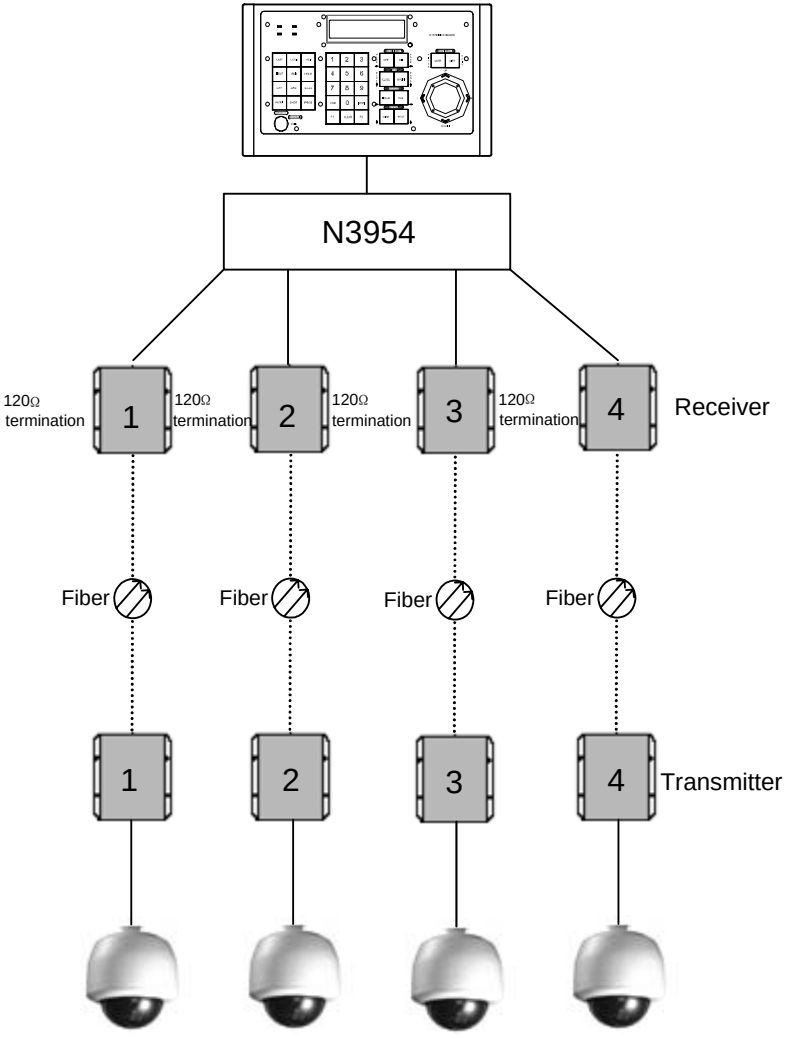


Figure 19. Code distributor diagram

Relation between 24VAC Cable Diameter and Transmission Distance

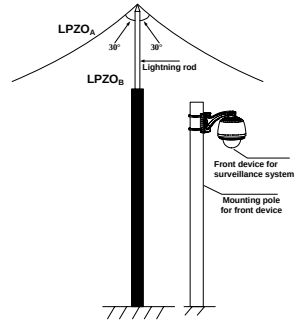
In general, the maximum allowable voltage loss rate is 10% for AC-powered devices. The table below shows the relationship between transmission power and maximum transmission distance under a certain specified cable diameter, on condition that the 24VAC voltage loss rate is below 10%. According to the table, if a device rated at 50W is installed 17-meter away from the transformer, the minimum cable diameter shall be 0.8000mm. A lower diameter value tends to cause voltage loss and even system instability.

Diameter (mm) / Distance (ft / m) / Power (W)	0.8000	1.000	1.250	2.000
10	283 (86)	451 (137)	716 (218)	1811 (551)
20	141 (42)	225 (68)	358 (109)	905 (275)
30	94 (28)	150 (45)	238 (72)	603 (183)
40	70 (21)	112 (34)	179 (54)	452 (137)
50	56 (17)	90 (27)	143 (43)	362 (110)
60	47 (14)	75 (22)	119 (36)	301 (91)
70	40 (12)	64 (19)	102 (31)	258 (78)
80	35 (10)	56 (17)	89 (27)	226 (68)
90	31 (9)	50 (15)	79 (24)	201 (61)
100	28 (8)	45 (13)	71 (21)	181 (55)
110	25 (7)	41 (12)	65 (19)	164 (49)
120	23 (7)	37 (11)	59 (17)	150 (45)
130	21 (6)	34 (10)	55 (16)	139 (42)
140	20 (6)	32 (9)	51 (15)	129 (39)
150	18 (5)	30 (9)	47 (14)	120 (36)
160	17 (5)	28 (8)	44 (13)	113 (34)
170	16 (4)	26 (7)	42 (12)	106 (32)
180	15 (4)	25 (7)	39 (11)	100 (30)
190	14 (4)	23 (7)	37 (11)	95 (28)
200	14 (4)	22 (6)	35 (10)	90 (27)

Lightning & Surge Protection

The product adopts multi-level anti-lightning and anti-surge technology integrated with gas discharge tube, power resistor and TVS tube. The powerful lightning and surge protection barrier effectively avoids product damage caused by various pulse signals with power below 4kV, including instantaneous lightning, surge and static. However, for complicated outdoor environment, refer to instruction below for lightning and surge protection:

- The product features with dedicated earth wire, which must be firmly grounded. As for surveillance sites beyond the effective protection scope, it's necessary to erect independent lightening rods to protect the security devices. It's recommended to separate the lightning rod from the mounting pole, placing the rod on an independent pole, as shown in the figure below. If the product has to be installed on the same pole or pedestal for lightning rod, there should be strict insulation between the video cable BNC terminal, power cable, control cable and the standing pole of the lightning rod.
- For suburb and rural areas, it's recommended to adopt direct burial for the transmission cables. Overhead wiring is prohibited, because it's more likely to encounter lightning strike. Use shielded cables or thread the cables through metal tubes for burial, thus to ensure the electric connection to the metal tube. In case it's difficult to thread the cable through the tube all the way, it's acceptable to use tube-threaded cables only at both ends of the transmission line, yet the length in burial should be no less than 15 meters. The cable sheath and the tube should be connected to the lightning -proof grounding device.
- Additional high-power lightning-proof equipment and lightning rods should be installed for strong thunderstorm or high induced voltage areas (such as high-voltage substation).
- The lightning protection and grounding for outdoor devices and wires should be designed in line with the actual protection requirement, national standards and industrial standards.
- The system should perform equipotential grounding by streaming, shielding, clamping and earthing. The grounding device must meet anti-interference and electric safety requirements. There should be no short-circuiting or hybrid junction between the device and the strong grid. Make sure there's a reliable grounding system, with grounding resistance below 4Ω (below 10Ω for high soil resistivity regions). The cross-sectional area of the earthing conductor should be no less than 25mm².



Separated layout for the lightning rod and the standing pole

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